CLAIMS:

1. A railway monitoring system, comprising:

an optical fiber, wherein a first part of the fiber is attachable to one of a pair of tracks of a rail, and wherein a characteristic of the first part of the fiber is variable in correspondence to variance of a characteristic of said one track where the first part of fiber is attached;

an optical signal emitter connected to the fiber for emitting an optical signal into the fiber, wherein the fiber generates at least a first altered optical signal, which contains information relating to the variance of the characteristic of the part of the fiber; and

an optical signal analyzer connected to the fiber for receiving and analyzing the first altered optical signal so as to ascertain the variance of said characteristic of said one track based upon the information contained in the first altered optical signal.

2. The system of Claim 1, wherein both the emitter and the analyzer are connected to an end of the fiber, and wherein the first altered optical signal is a signal reflected by the fiber towards said end.

3. The system of Claim 2, wherein the first part of the fiber includes a first Bragg grating created therein for generating the first reflected optical signal, wherein a characteristic of the first Bragg grating is variable in correspondence to the variance of said characteristic of said one track, and wherein the first reflected optical signal contains information relating to the variance of the characteristic of the first Bragg grating.

4. The system of Claim 3, wherein the first Bragg grating is pre-strained in a direction at least substantially parallel to said one track.

5. The system of Claim 3, wherein the characteristic of the first Bragg grating relates to a grating period of the first Bragg grating, and wherein the grating period is variable in correspondence to a change in a tensile strain that the first Bragg grating experiences.

6. The system of Claim 5, wherein the first Bragg grating is attached to said one track such that the first Bragg grating experiences a same tensile strain as said one track.

7. The system of Claim 3, wherein the optical signal analyzer detects a shift in a wavelength of the first reflected optical signal for ascertaining the variance of the characteristic of the first Bragg grating.

8. The system of Claim 7, comprising a counter in connection with the optical signal analyzer for counting the number of the shifts in the wavelength of the first reflected optical signal, wherein said number relate to the number of axles of a train that passes over the first Bragg grating.

9. The system of Claim 8, comprising a clock in connection with the optical signal analyzer for measuring a period of time between a predetermined number of successive shifts in the wavelength of the first reflected optical signal so as to ascertain a speed of the train.

10. The system of Claim 7, further comprising a processor in connection with the optical signal analyzer, wherein the processor ascertains a period of time between two successive trains by

constantly measuring a period of time between two successive shifts in the wavelength of the first reflected optical signal;

comparing said period of time between two successive shifts with a predetermined threshold value; and

determining the period of time between two successive trains if said period of time between two successive shifts exceeds the predetermined threshold value.

11. The system of Claim 7, wherein the characteristic of the first Bragg grating relates to a grating period of the first Bragg grating, and wherein the grating period is variable in correspondence to a change in an environment temperature that the first Bragg grating experiences.

12. The system of Claim 11, wherein the optical signal analyzer ascertains change in the environment temperature by

ascertaining whether there is a shift in the wavelength of the first reflected optical signal; and

simultaneously ascertaining whether such a shift varies during a predetermined period.

13. The system of Claim 7, further comprising a second Bragg grating created in a second part of the fiber attachable to the other track for ascertaining variance of a characteristic of the other track, wherein the second Bragg grating generates a second reflected optical signal receivable by the optical signal analyzer, wherein shift in the wavelength of the second reflected optical signal in correspondence to the variance of the characteristic of the other track is detectable by the optical signal analyzer.

14. The system of Claim 13, further comprising a processor in connection with the optical signal analyzer for ascertaining an imbalance on the pair of tracks based upon the shifts in the wavelengths of the first and second reflected optical signals.

15. The system of Claim 14, further comprising a plurality of Bragg gratings created in the fiber and attachable to the pair of tracks, wherein the first,

second and plurality of Bragg gratings are positioned in correspondence to spacing between axles and bogies of a train for ascertaining a characteristic of the train.

16. A process for monitoring a railway system, comprising:

placing an optical fiber along at least a part of a track of a rail;

attaching a portion of the optical fiber to said track such that a characteristic of the fiber varies with a variance in the track;

emitting a signal along said fiber that may be altered by said variance of the portion of the fiber; and

analyzing the varied signal to determine information relating to said rail.

17. The process of Claim 16, wherein said information further relates to a train or vehicle on said rail.